

PATENT CLAIMS:

1. A method for manufacturing foamed polyurethane molded articles, in which an expandable polyurethane reactive mixture is introduced into a mold and the mold is evacuated; following the charging operation, the reactive mixture expands, filling the mold; gases liberated during the expansion process being exhausted through expansion openings located at one or more points of maximum height in the top mold half; following the setting operation, the mold being vented and the molded article being ejected, wherein the expansion openings are formed by needle valves which are controlled in such a way that they close immediately in response to the ingress of the foam front into the valve capillary.
2. The method as recited in claim 1, wherein the needle valves are additionally used for evacuating the mold subsequently to the charging of the reactive mixture.
3. The method as recited in claim 1 or 2, wherein, to control the needle valve(s), a chemical and/or physical quantity that changes rapidly in response to the ingress of the foam front into the valve capillary is recorded, and the needle valve is controlled as a function of the time characteristic of this quantity.
4. The method as recited in claim 3, wherein the temporal pressure characteristic in the valve capillary is sensed and used for control purposes, the control being designed in such a way that the valve closes immediately in response to the pressure drop in the capillary occurring when the foam front penetrates into the valve capillary.
5. The method as recited in one of claims 1 through 4, wherein the needle valves are additionally used for venting the mold.
6. The method as recited in one of claims 1 through 5, wherein the needle valves are also used for acting upon the mold with compressed air to assist in the removal process.

7. The method as recited in one of claims 1 through 6,
wherein a plurality of needle valves is supplied with negative pressure and/or with
compressed air from a shared media supply.
8. The method as recited in one of claims 1 through 7,
wherein, when working with a plurality of needle valves, the negative pressure is adjusted
individually.
9. A device for implementing the method as recited in one of claims 1 through 8,
comprising a mold having a top mold region, a suction opening for evacuation purposes and
a device for venting the mold, as well as expansion openings at one or more points of
maximum height in the top mold region,
wherein the expansion openings are formed by needle valves (1) which are controllable in
such a way that they close immediately in response to the first ingress of the foam front into
the valve capillary (5).
10. The device as recited in claim 9,
wherein the suction opening is likewise formed by the needle valves (1).
11. The device as recited in claim 9 or 10,
wherein a sensor is provided for recording a physical or chemical quantity that changes
rapidly in response to the ingress of the foam front into the valve capillary (5), as is a
control device for controlling the needle valve (1) as a function of the output signal from
the sensor.
12. The device as recited in one of claims 9 through 11,
wherein the sensor is a pressure sensor (6) situated in the valve capillary (5), and the control
is designed in such a way that the closing function of the valve (1) is able to be triggered in
response to the pressure drop occurring when the foam front penetrates into the valve
capillary (5).
13. The device as recited in one of claims 9 through 12,
wherein the mold (10) is additionally able to be acted upon by compressed air via the
needle valve (1).

14. The device as recited in one of claims 9 through 13,
wherein the needle valve(s) 1 is (are) connected in series to a four-way valve (11), by way
of which a communication is able to be established with a negative (12, 13) and/or positive
pressure source (14), as well as with atmospheric pressure (15).

15. The device as recited in claim 14,
wherein the four-way valve (11) is a proportional valve.

16. The device as recited in one of claims 9 through 15,
wherein a plurality of needle valves (1) is able to be supplied in each instance with negative
pressure and/or with compressed air from a shared media supply.